Cynthia C. Hauer, CCDM, CMII

Principles-Based Data Management

Creating Expectations Through Consistency

NDIA Technical Information Division

Configuration Data Management Symposium

Data Management Panel

New Orleans, LA - August 2003

Agenda

- Background Problem Statement
- Why a “principles-based” approach?
- Challenges
  - Business case for “doing better”
  - EIA-859
    - Content
    - Status
- Where do we go from here?
- Questions & Feedback

Background, History, Present, & Future

Background Problem Statement

Changing Environment

1950

200

Business Relationships

Vertical Integration.....Trust-Based Relationsh

Design Responsibility

DoD Design Bureaus.....Industry Design Tea

Standards Development & Implementation

Mil-Specs, Mil-Stds.....Commercial Standa

Acquisition Cycle

12 - 15 years.....2 - 5 years

Computer Systems Development Cycle

NA.....18 - 24 Months

Weapon System Life Cycle

20 years.....50+ years

Commercial Systems Life Cycle

10 - 15 years.....2 - 5 Years

Logistics Support

DLA, DoD Depots & IMAs.....Mix of Government and Contractor Logisti

Transaction-based.....Performance-b

Data Management Yesterday

- Library functions, skills
  - Archiving, filing, distributing, copying
- Contract management support
  - Data Rights, Proprietary Data
  - Data pricing, marking, ordering
- ★ Maintaining & tracking document deliverables
- Data Calls to functional areas
- A provider of *Documents* - not Information
- Part of - or not part of - Configuration Management?

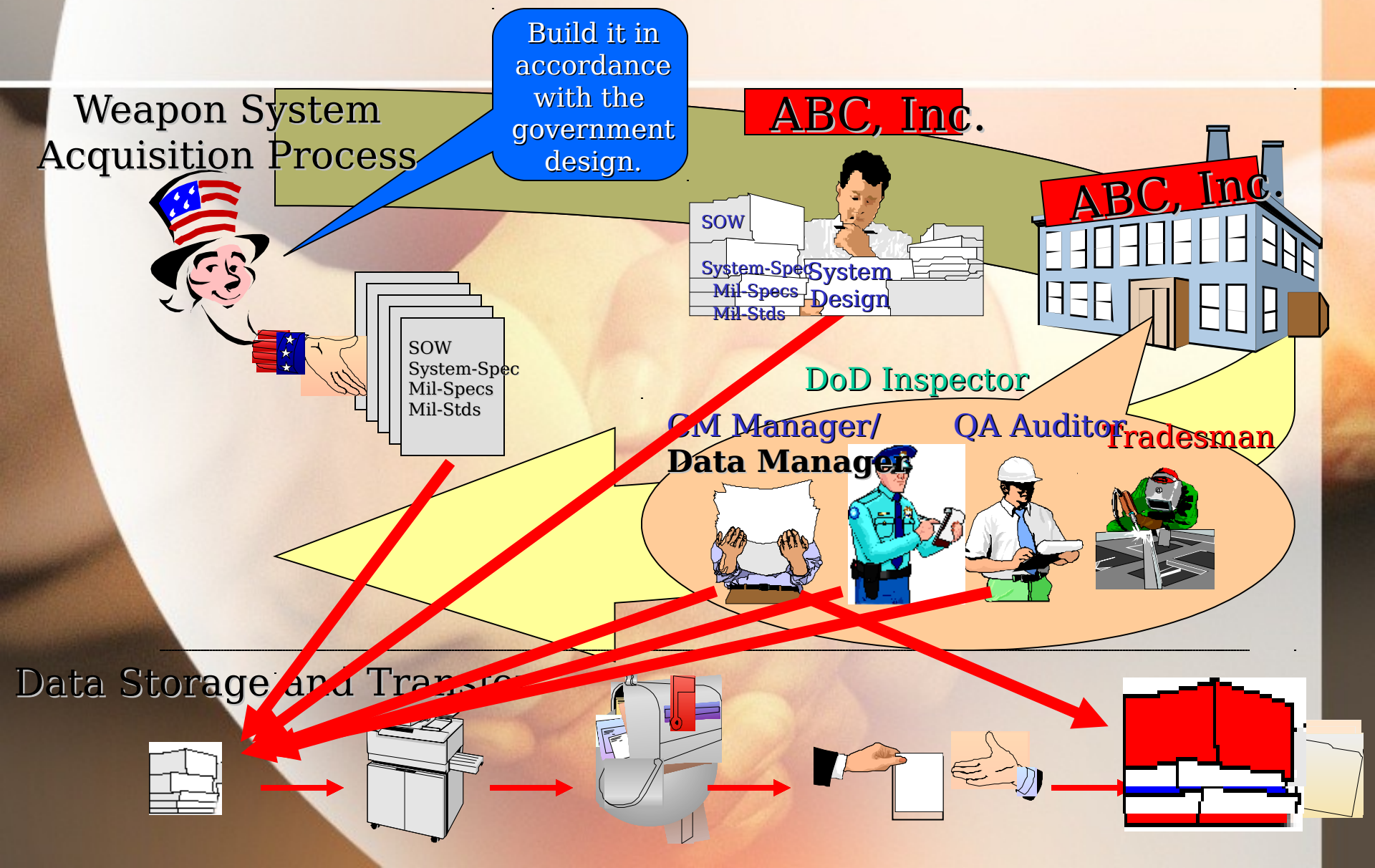
A clerical, administrative, inconsistently-practiced adjunct to CM

Current Status of the DM Practice

Generally …

- Misunderstood, antiquated
- Practiced inconsistently
- Poorly staffed, or not staffed at all
- ★ “Absorbed” poorly into Information Technology
- In need of guidance, standards
- An untapped resource for trading partners
  - Experience, expertise that are not applied, leveraged, understood
  - Due to staffing, downsizing, confusion: no longer present for duty
- No standardized practice - no current training

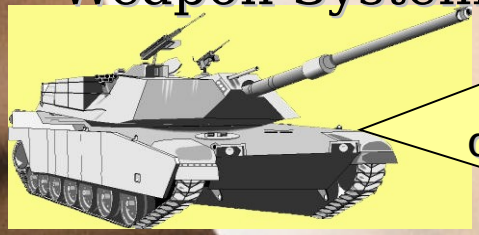
Yesteryear's Environment



Yesteryear's Environment, cont.

Weapon System Acquisition Process

Weapon System

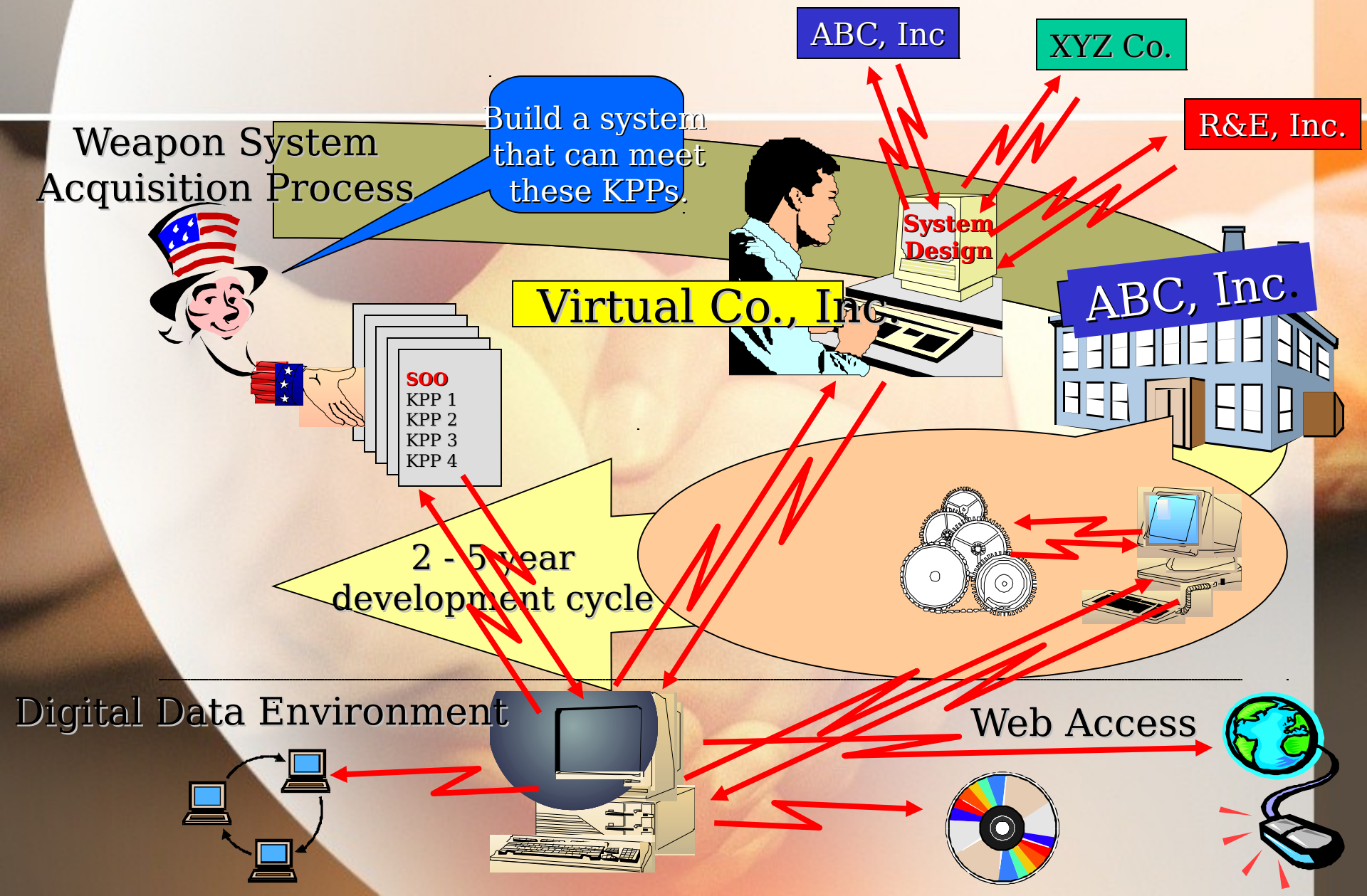


12 - 15 year development cycle

Data Environment: Paper-based

Site A Data ? Site B Data ? Site C Data

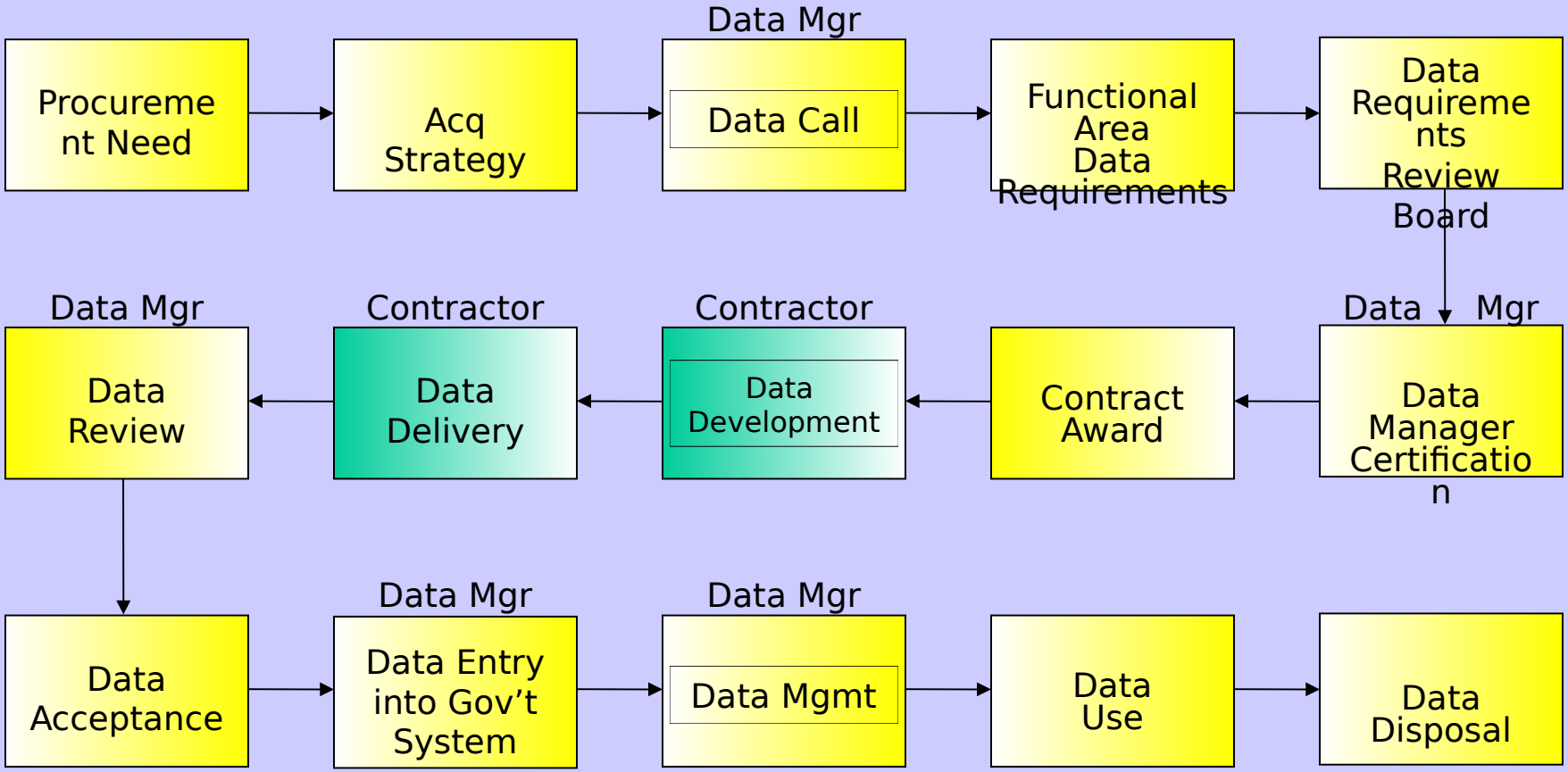
Today's Environment



Impact of Acquisition Reform

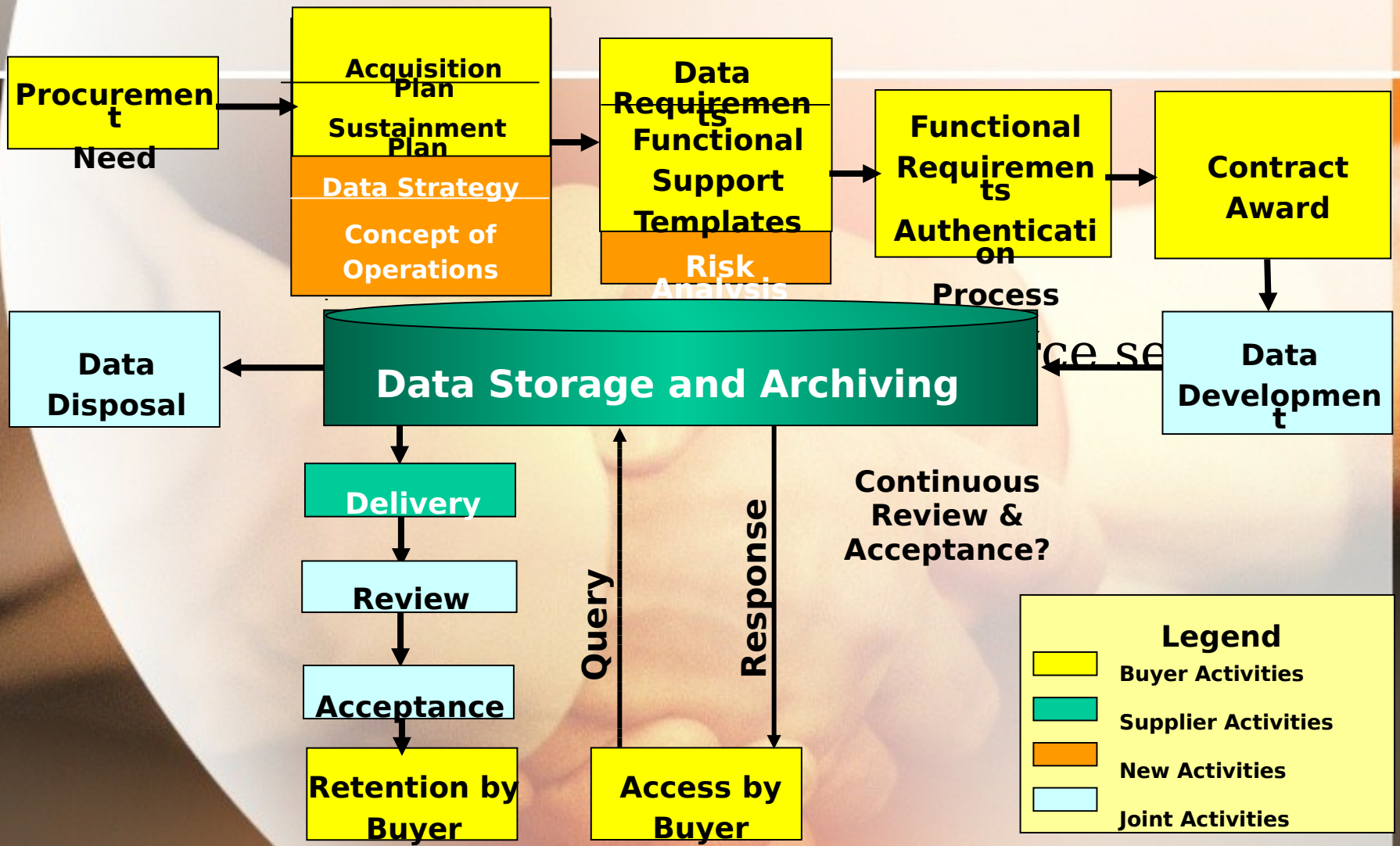
- Cancellation of MIL-STDs & Specs; contracts without MIL references
- Government asking how industry intends to implement CM
- Focus of government configuration control on performance requirements
- Contractor responsible for design solution
- Government oversight based on process adequacy
- Allocation of more logistic support responsibility to contrac

Traditional DM



- Dedicated and experienced Data Manager
- Assumed all contract required data is delivered
- Philosophy was "Buy Everything!"
- Heavy government DM activity - little contractor activity

Evolving DM Model



Motivations to Reinvent DM
Time is Right to Re-look at Data Management

World Has Entered the Information Age

- DoD and Industry Data Management Left Behind in a "Paper World"

- New Technologies Offer Great Opportunities to Reduce Cost and Improve Efficiency
- People Ready For Change
- We All Complain About What's Wrong
  - We Now Have A Chance to Make it Right
- Maybe sustainment should have been the goal, all along?
- Data is now the most costly item of all?

Transition to Industry Standards

DoD Mandates

MIL-STD-973
Configuration Mgt

MIL-STD-2549
CM Data Exchange

DoD 5010.12-M
Acq & Mgt. Tech Data

Evolve CM/DM Standards

Industry Practices Based on Sound Principles

ANSI/EIA-649
EIA-836
EIA-859

Broader applicability to include the commercial sector

Leverage the latest information technologies and system, e.g., XML

Continue “harmonization” efforts with related programs, e.g, electronic data interchange, STEP, etc.

CM/DM = configuration management/data management

Why Is a Consensus Standard for Data Management Needed?

- Data costs a lot
- Can’t find data when we need it
- Nobody thinks we do a good job of procuring and managing data
- A lot has changed
- Do not have a contemporary source of sound principles and best practices that address digital data

EIA 859 Objectives

- Couple data strategies to enterprise business strategies and make them requirements-based
- Shift from delivery to access
- Move DM into a performance-based environment
- Professionalize the field
- Connect (acquisition) data management with IT data management

Building the Business Case

Business Case

- Purpose – understand return on investment in data management standard(s)
- Assumptions
  - Technology is a given
  - Motivations for having standard(s) are
    - Articulate effective and efficient data management behaviors in current and “near future” environment
    - Reap scale effects from multiple trading partner adoption
  - Business case needs to address both motivations

Observation

Principles

- Data is a valuable and costly corporate asset for any enterprise.
- The effectiveness of an enterprise increases with improved quality and use of data.
- DM includes the management of data, data products, and data views.
- . . .

Principles themselves do not determine economic return on data management

Behavior Has Economic Consequences

Principles

Enablers

- Data products and views are identified so that their requirements and attributes can be controlled.
  - Assign unique identifiers to distinguish items from similar or related data products.
    - Identify documents sufficiently to permit retrieval of the desired data product.
- . . .

- Principles themselves do not determine economic return on data management
- Behaviors, extent to which they are consistent with enablers, determine economic consequences
- Hence, will measure effects of DM behaviors

Measuring - an Example Task

Identify documents sufficiently to permit retrieval of the desired data products

DM Model	I Initial	II Transition	III Advanced (Consensus standards-based)
Description	May be identified at time of creation. No indexing system available to aid retrieval or record inventory	Identification sufficient to permit retrieval within some local settings.	Data are routinely identified for retrieval; easily retrievable across trading partner interfaces
Representative retrieval success rate (in xx hours)	18%	30-50%	99%

Creating a DM Capability Model

DM Model	I Initial	II Transition	III Advanced (Consensus Standards-based)
Description	May be identified at time of creation. No indexing system available to aid retrieval or record inventory	Identification sufficient to permit retrieval within some local settings.	Data are routinely identified for retrieval; easily retrievable across trading partner interfaces
Representative retrieval success rate (in xx hours)	20%	30-50%	99%

- Will need similar description triads for each enabler/sub-enabler
- When complete, amounts to DM capability model
- Associated success rates are inputs to analysis

Overview

- Purpose -- state business case for investing in data management standard
- Assumptions
  - Technology is a given
  - Motivations for having a s
    - Articulate effective and effic
      behaviors in current and "near
    - Reap scale effects from multiple trading partner adoption
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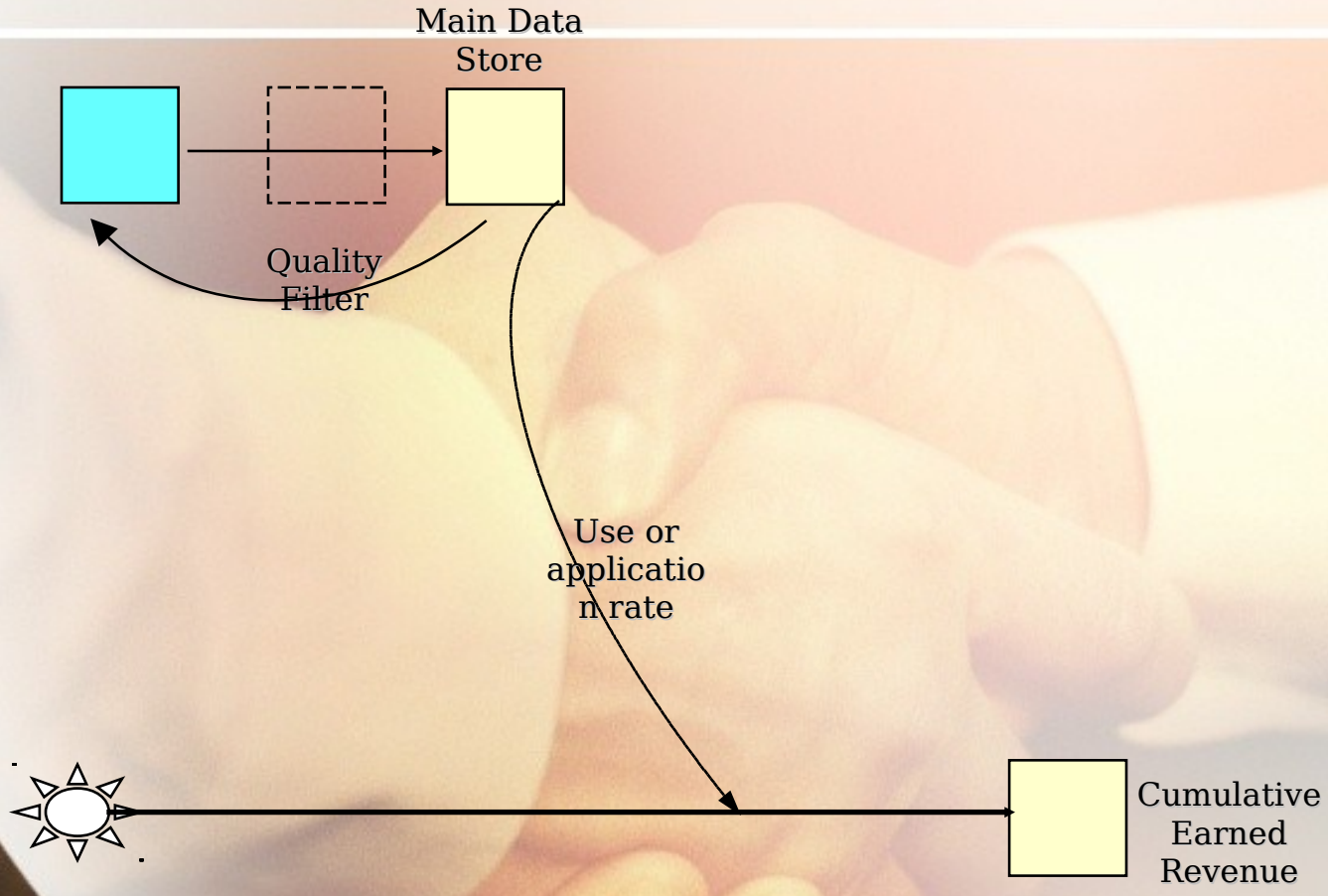
Today's presentation addresses preliminary model related to this motivation.

Basic Concept



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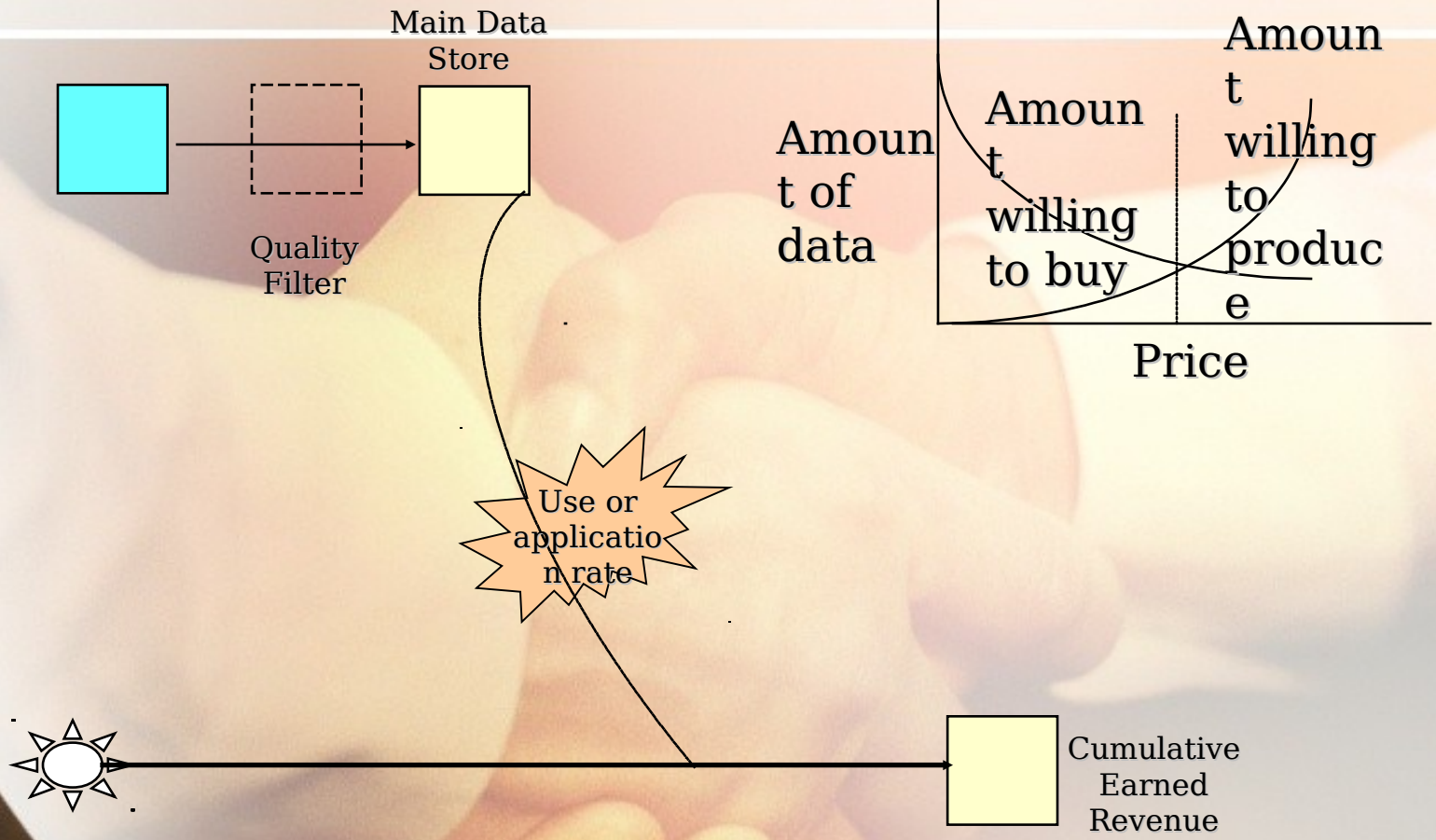

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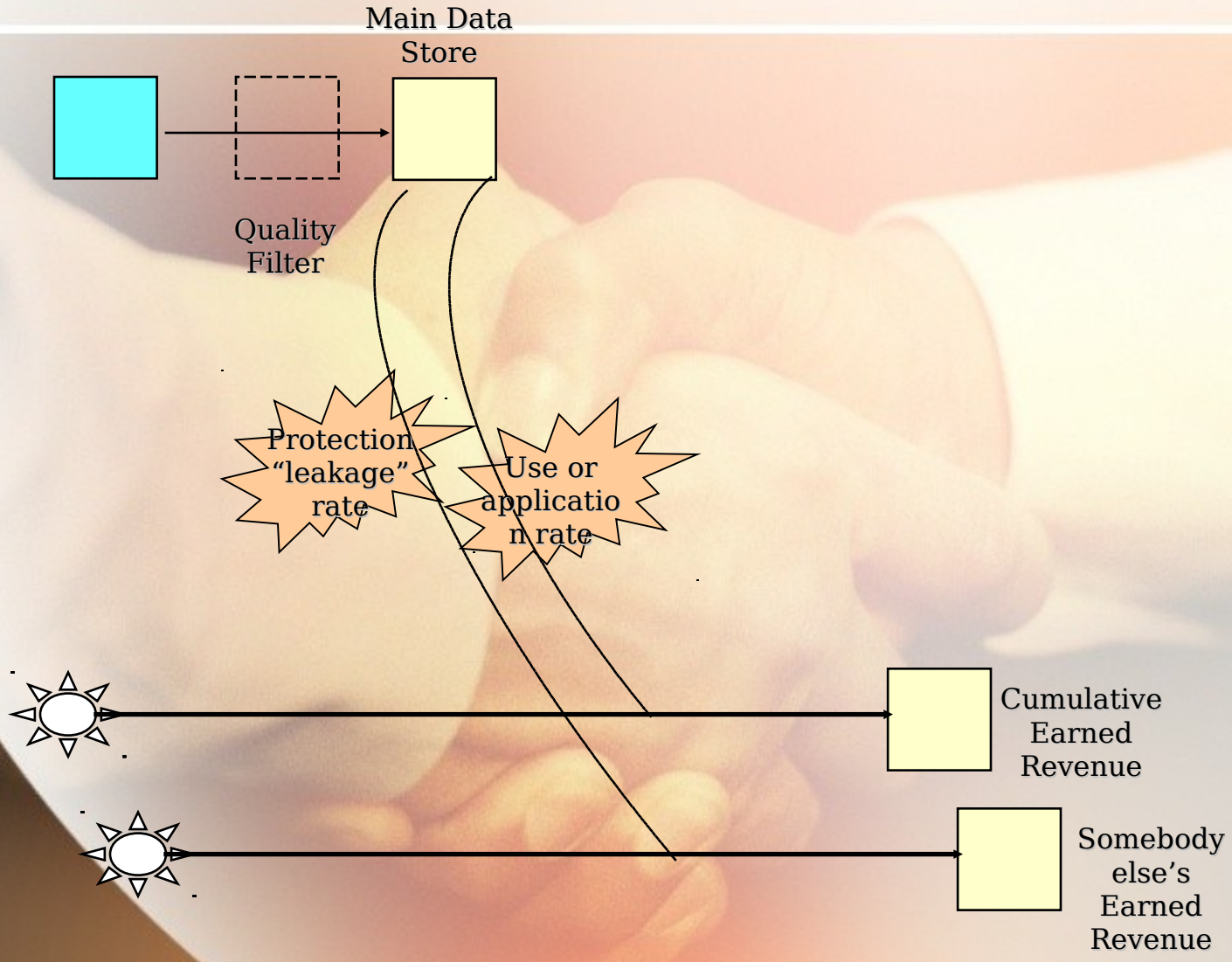

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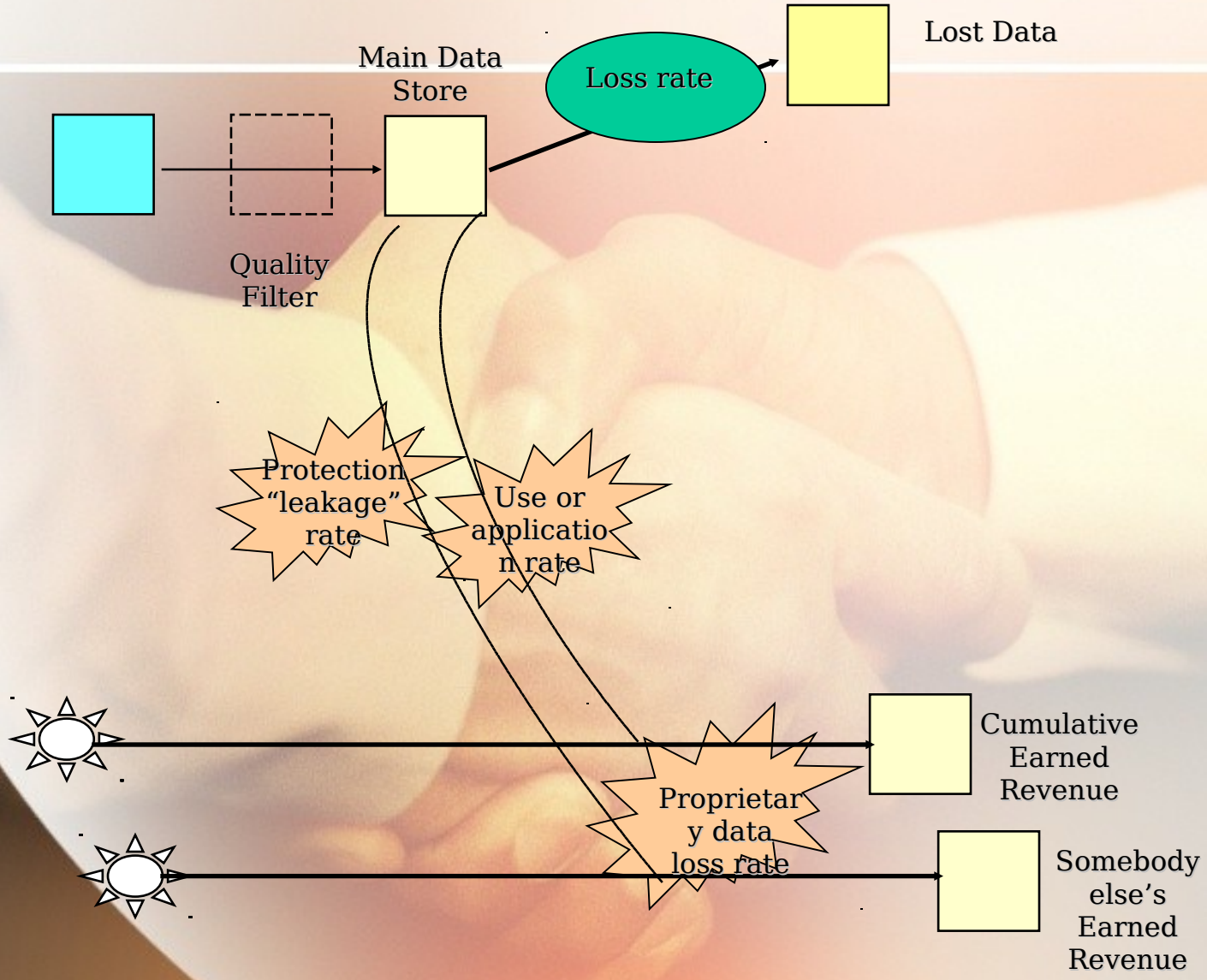

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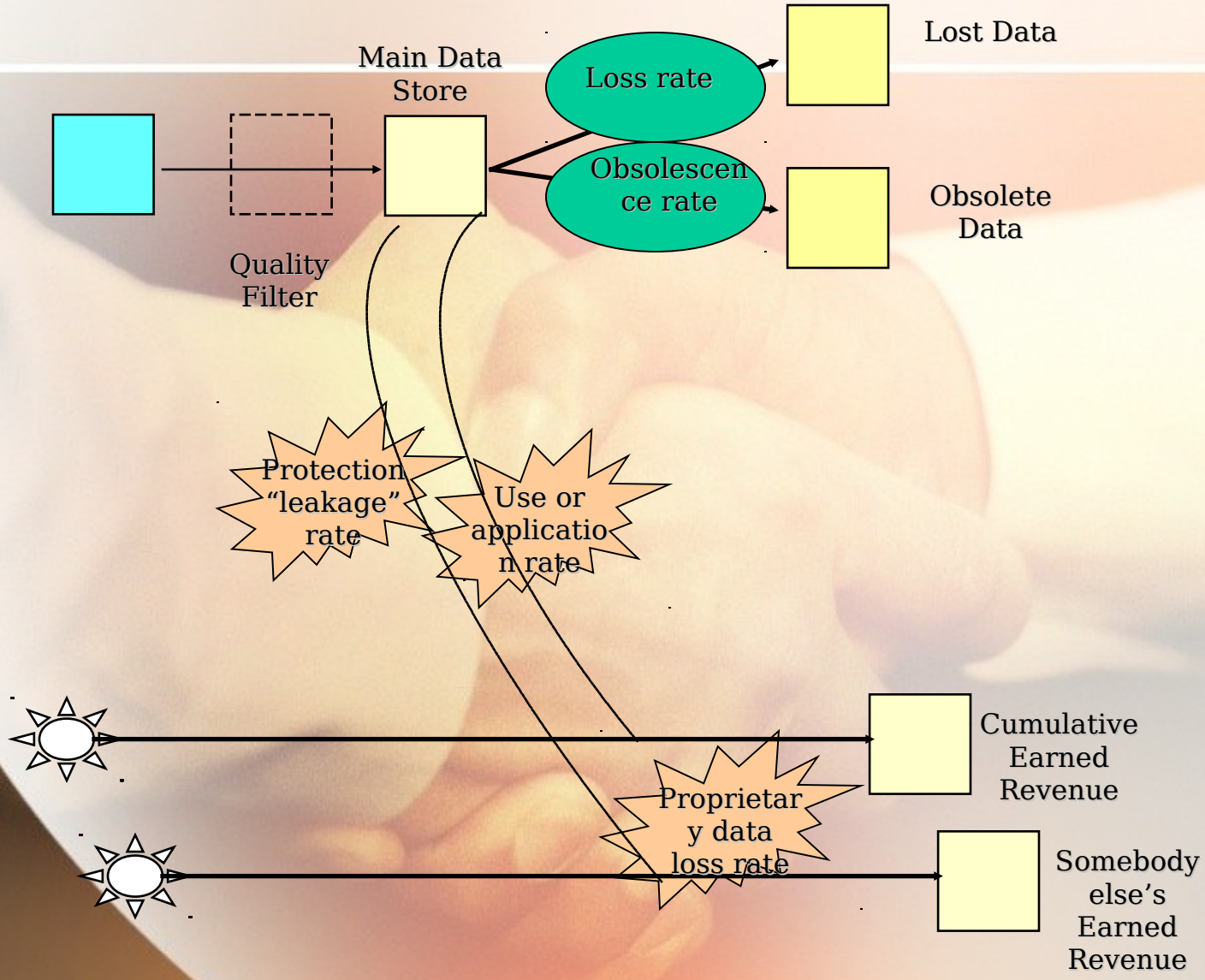

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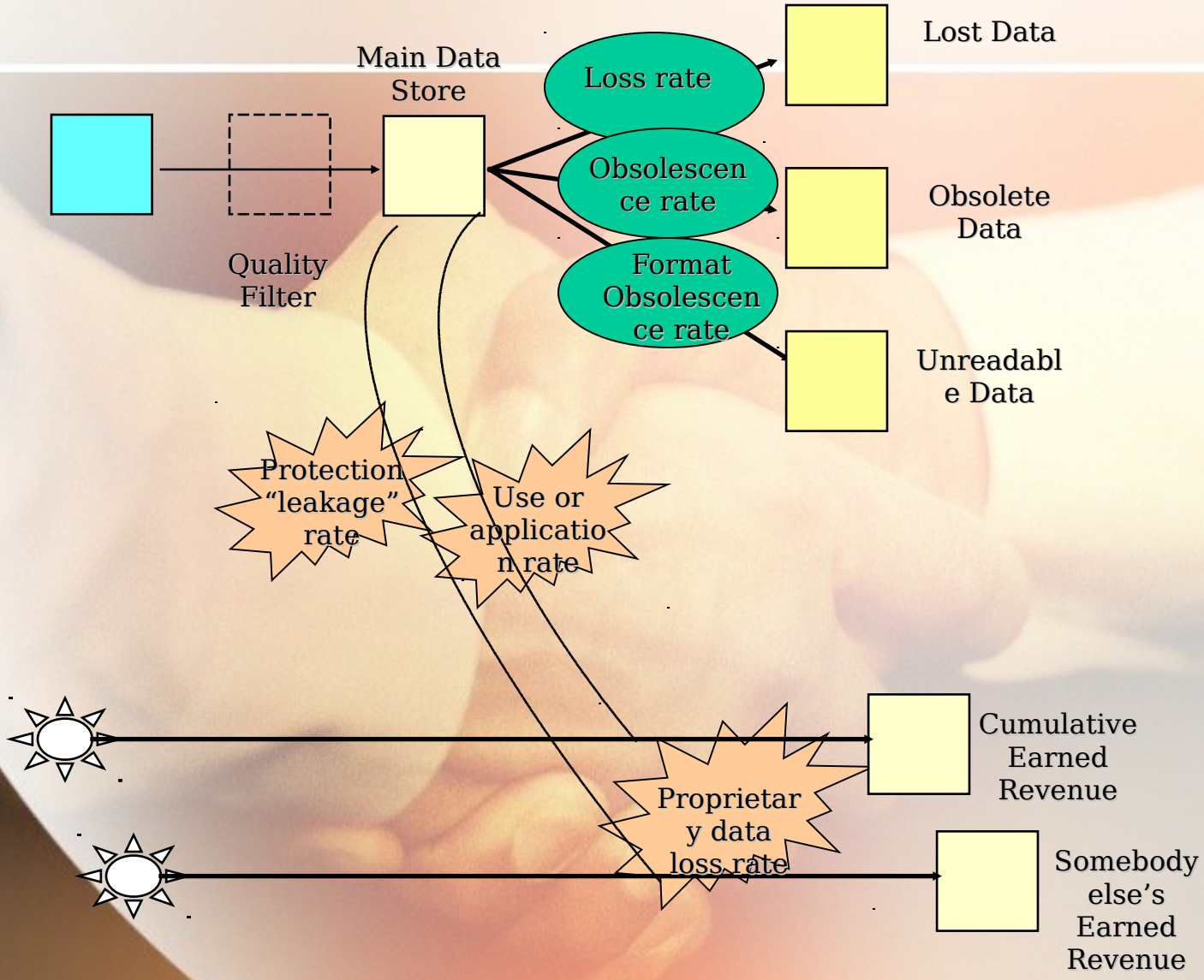

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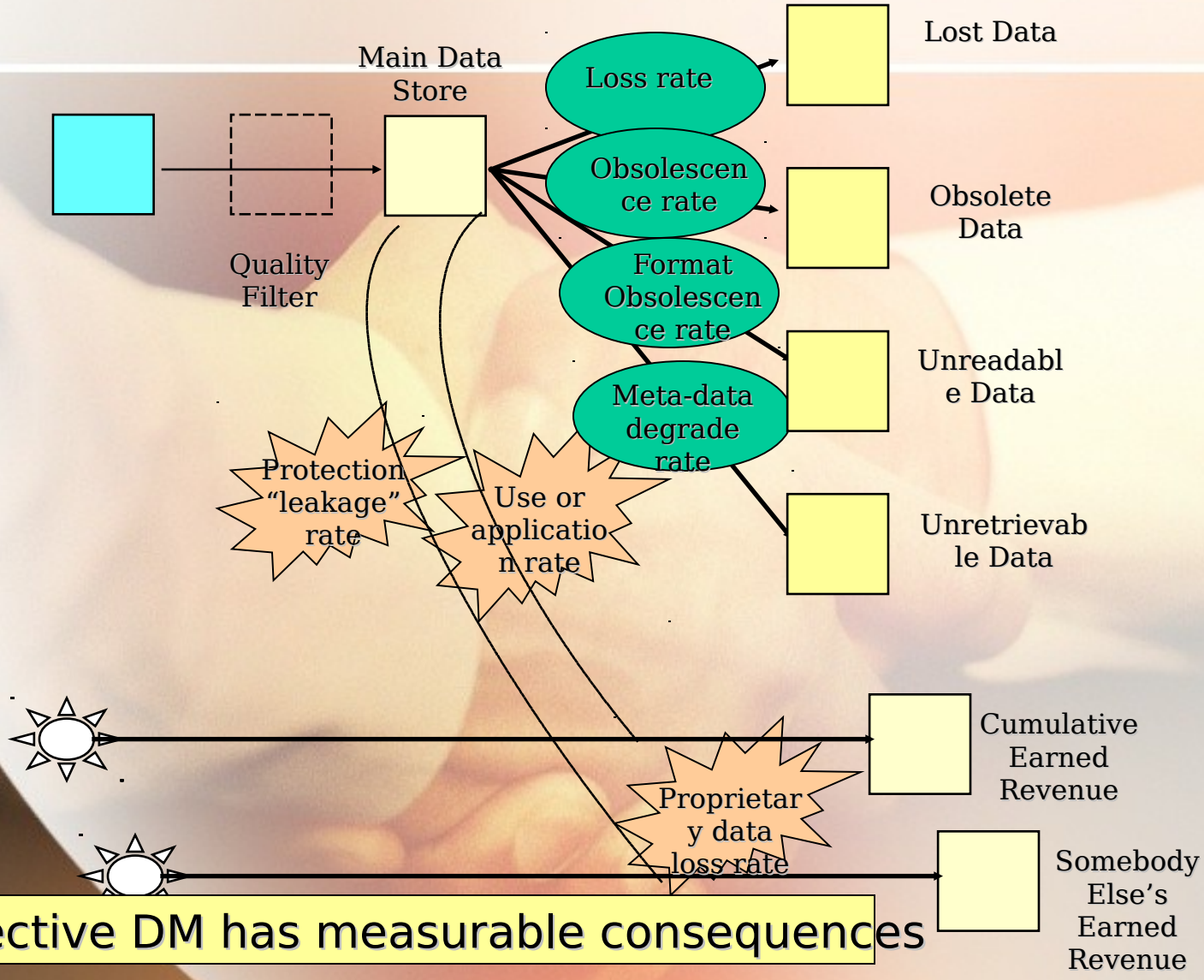
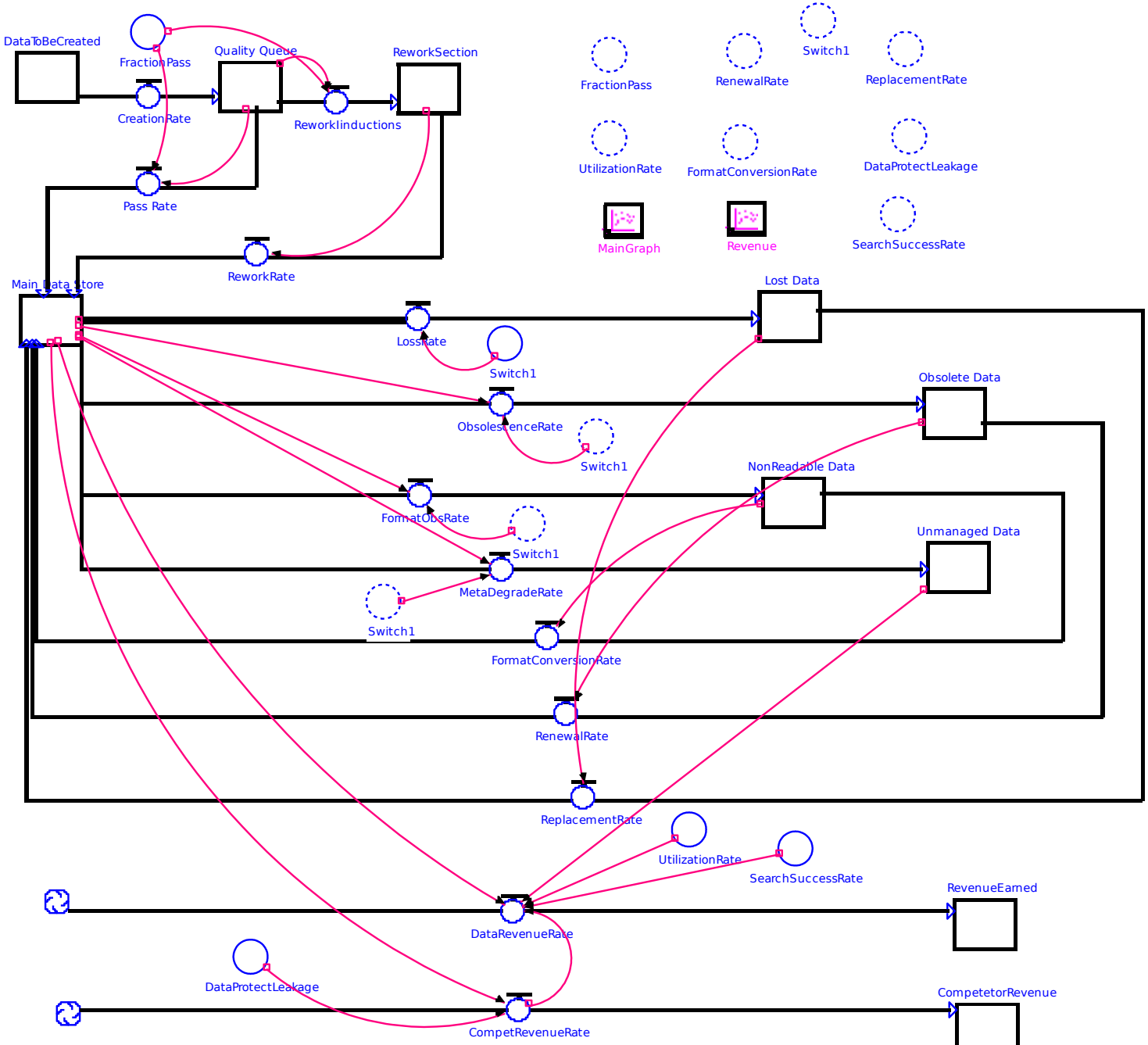


Poor or Effective DM has measurable consequences

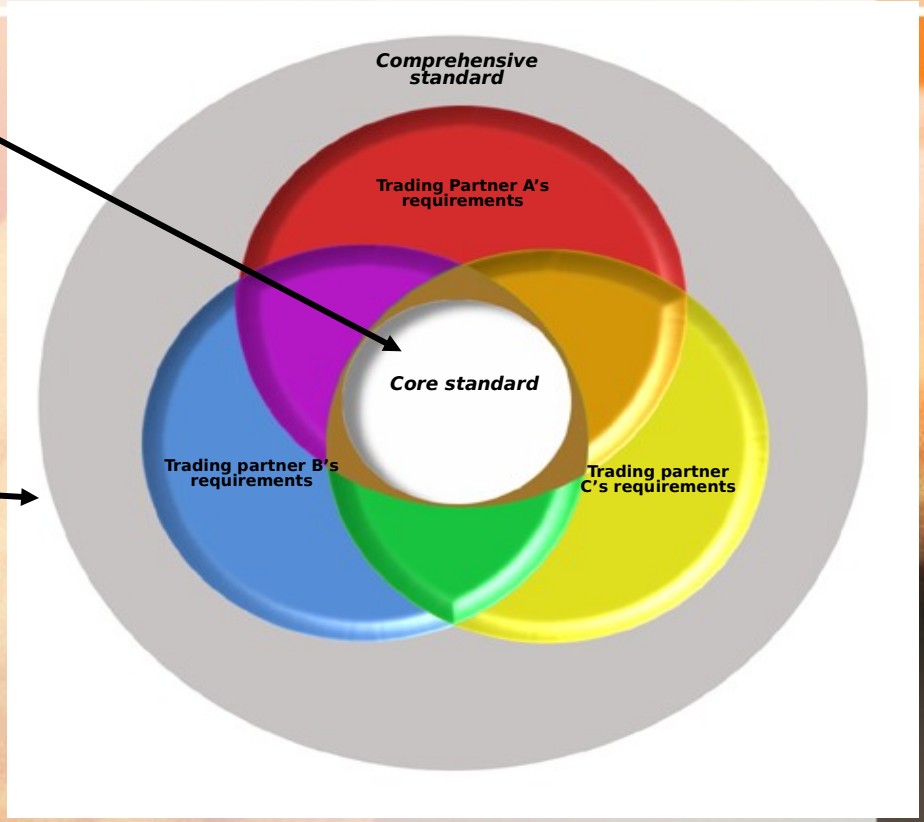


“I-think” model logic flow

Why a “principles-based” approach?

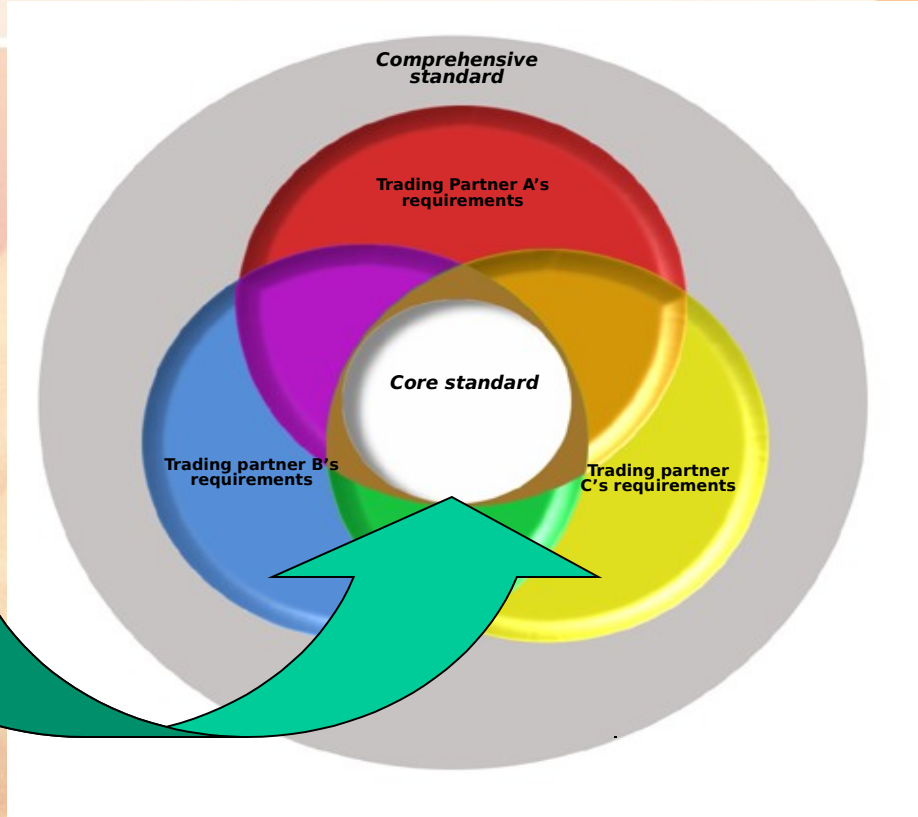
Two Choices with Standards

- Work on a “core” standard
  - What everybody can agree on
  - Tends to be relatively fast, small, successful
- Work on a comprehensive standard
  - What everybody might need
  - Tends to be slow, large, unsuccessful



EIA-859 Is a “Core” Standard

- Appropriate for commercial standard
- Focus on subset that everybody needs and can agree on
- (Hopefully) well written and clear
- Naturally, does not cover everything any particular firm or government agency might need



Vision Statement for EIA-859 Industry Consensus Standard for DM

- The concise guide for the data management community of practice
- An industry consensus document for trading partners
- Principles and processes for the management of data
- Best practices for DM

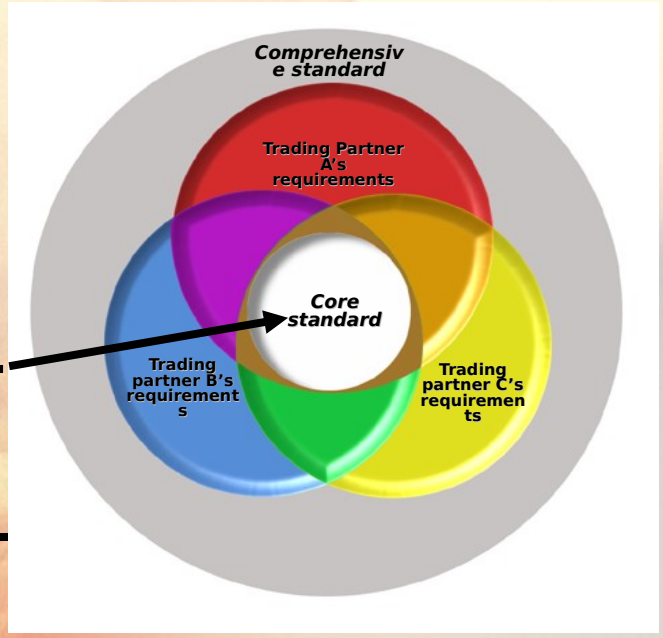
Target: Available for balloting 2003

Purpose and Scope

- Purpose
  - Guide to acquire and manage data across product *and data* life-cycles
  - Enable sharing of data among trading partners

    … in a performance-based digital environment

- Scope
  - Common principles
  - Related enablers
  - Key practices
  - Application templates



EIA-859 Structure & Content

- Nine principles
  - Fundamental truth statements for consistent DM
- Associated enablers
  - Implementers for the principles
  - “If…then” statements
- Key Practices
  - Suggested guidelines, in the absence of existing organizational processes or practices
- Application Templates
  - Intended to guide the DM practitioner

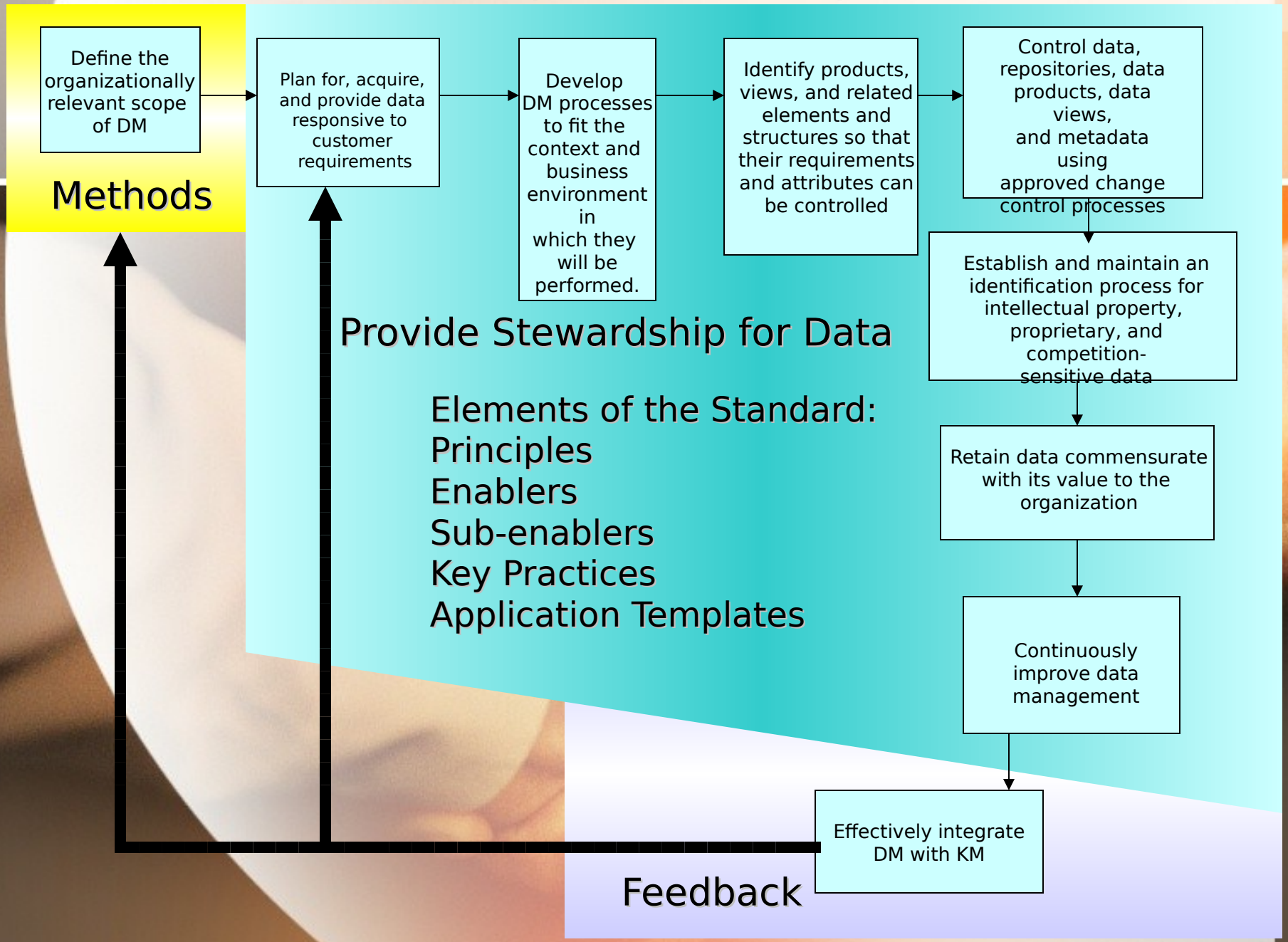
DM Definition

Data management is the structured processes and
systems that plan for, acquire, and maintain data,
consistent with requirements, throughout the data life cycle.

EIA-859 Data Management Principles

1. Define the organizationally relevant scope of Data Management
2. Plan for, acquire, and provide data responsive to customer requirements.
3. Develop DM processes to fit the context and business environment in which they will be performed.
4. Identify data products and views so that their requirements and attributes can be controlled.
5. Control data, repositories, data products, data views, and metadata using approved change control processes.
6. Establish and maintain an identification process for intellectual property, proprietary, and competition-sensitive data.
7. Retain data commensurate with value to the organization.
8. Continuously improve data management.
9. Effectively integrate Data Management with Knowledge Management.

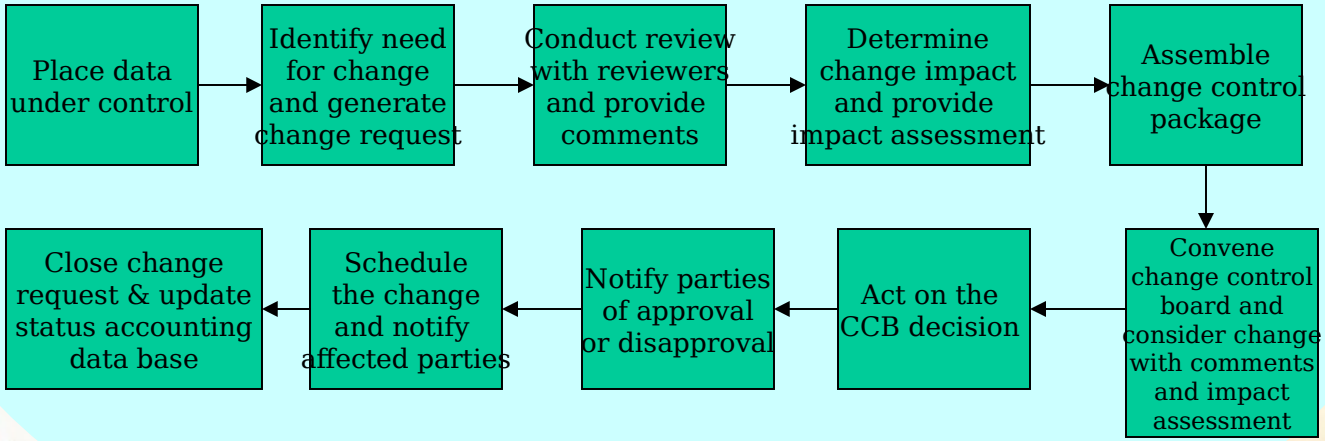
EIA-859 Top-Level Principles


Define the organizationally relevant scope of DM
Methods
Plan for, acquire, and provide data responsive to customer requirements
Develop DM processes to fit the context and business environment in which they will be performed.
Identify products, views, and related elements and structures so that their requirements and attributes can be controlled
Control data, repositories, data products, data views, and metadata using approved change control processes
Establish and maintain an identification process for intellectual property, proprietary, and competition-sensitive data
Retain data commensurate with its value to the organization
Continuously improve data management
Effectively integrate DM with KM
Provide Stewardship for Data
Elements of the Standard:
Principles
Enablers
Sub-enablers
Key Practices
Application Templates
Feedback

Life Cycle Flows and Process: Principle 5: EIA-859, Enabler 5.1.1

Control data, repositories, data products, data views, and metadata using approved change control processes

Enabler 5.1.1: Establish a consistent change control process.


Place data under control
Identify need for change and generate change request
Conduct review with reviewers and provide comments
Determine change impact and provide impact assessment
Assemble change control package
Convene change control board and consider change with comments and impact assessment
Act on the CCB decision
Notify parties of approval or disapproval
Schedule the change and notify affected parties
Close change request & update status accounting data base

Key Practices

- Consider which data requires control and at what level control is needed
- Evaluate control decisions as program needs and requirements evolve
- Apply the correct amount of control over data at the appropriate time
- Assemble decision data for the configuration control board
- Develop concise estimates of change impact and implications for CCB

Example Template

Principle 6 - Management of data rights for intellectual pro
proprietary data, and competition sensitive data is integra

Enabler 6-1: Establish and maintain an identification process t
include identification conventions for IP, proprietary, and comp
sensitive data.

- What is the data source?

Vendor		Trading Partner	
Subcontractor		Internally Developed	

- Is the data to be delivered?
- What is the delivery mechanism?

Hard copy	
Digital	
Media	

(continued, 1)

- Who is authorized to use the data and for what purpose?
- Are protection obligations and requirements determined?
- Are identification mechanisms/methods defined for each type of data?
- Is a patent required or applicable?
  If so, tag for patent application or verify existing patent.
- Is a copyright required or applicable?
  If so, tag for copyright application or verify existing patent.
- Is export required?
  If so, ensure export compliance requirements have been established and met.
- Are tracking mechanism/methods established for the following?

Requirements		Identification	
Approvals		Location	
Delivery		Electronic posting	
Distribution		Metadata	

(continued, 2)

- Are marking requirements established?
  If so, ensure that data is properly marked.
- Are user data access needs and requirements established?
  If so, ensure that definitions and granted access levels meet use
- Are user authorities (read/write access) granted?
- Is access security valid?

Purpose of the templates is to guide and assist the DM practitioner in applying the EIA-859 principles - and to map DM principles to organizational business practices and expectations.

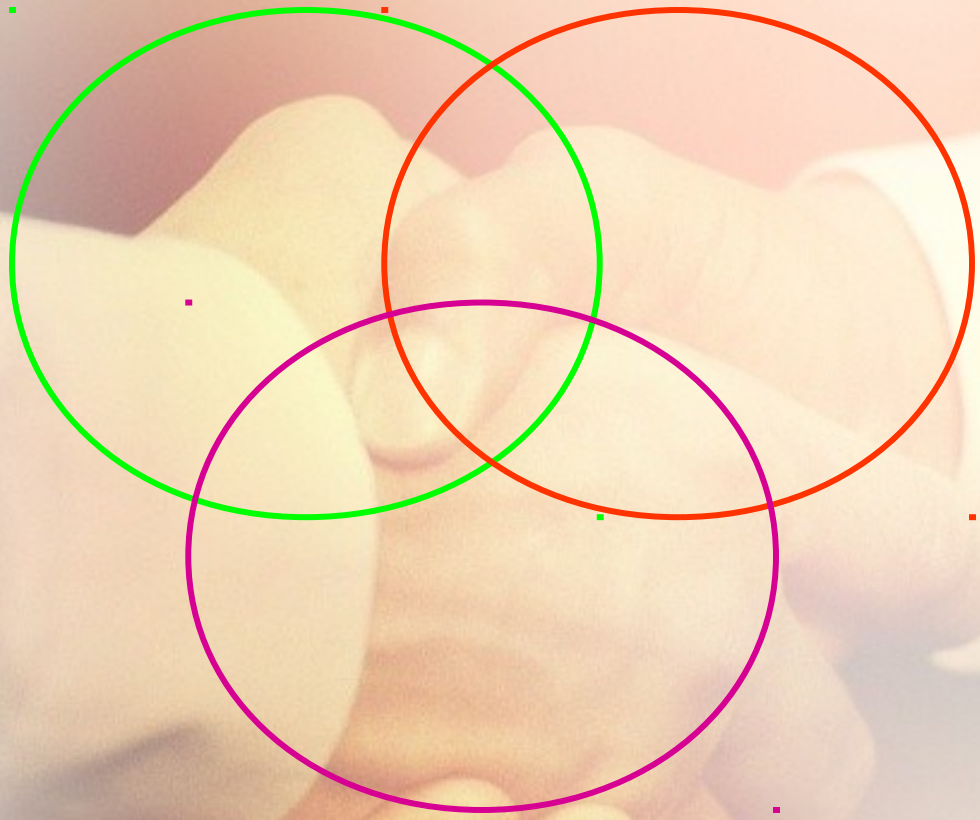
Challenges

Data Management “Solution”:

Three Primary Areas - Principles, Practices, and Training

Principles

- Basic tenets and values
- General



Practices

- Implementation specifics
- Organization-specific

Training

Basic and Advanced

(PM and Practitioner)

Data Management "Solution," continued

Three Primary Areas - Principles, Practices, and Training

Principles

- Basic tenets and values
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Practices

- Implementation specifics
- Some are organizational-specific

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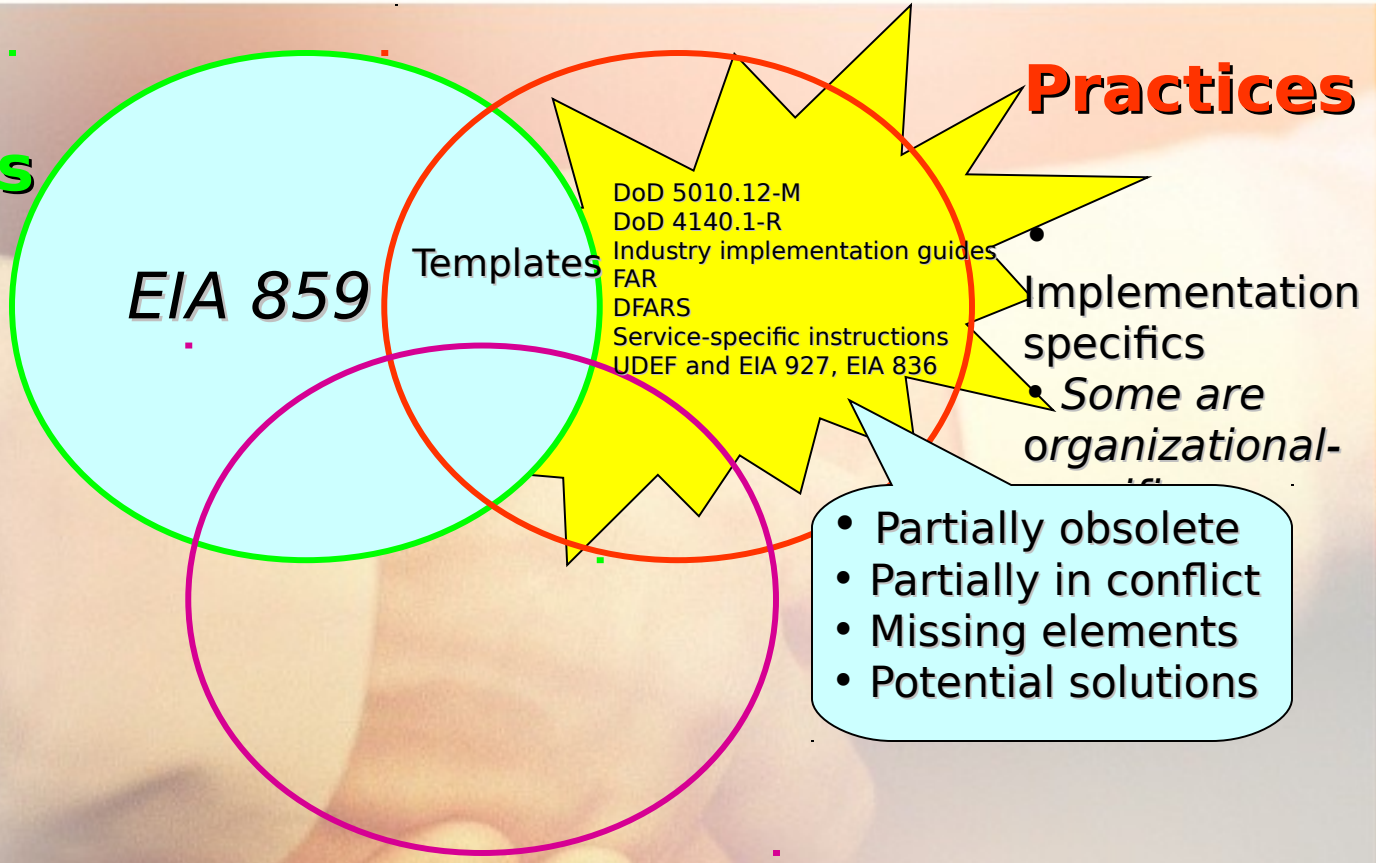
Basic and Advanced
(PM and Practitioner)

Data Management "Solution," continued

Three Primary Areas - Principles, Practices, and Training



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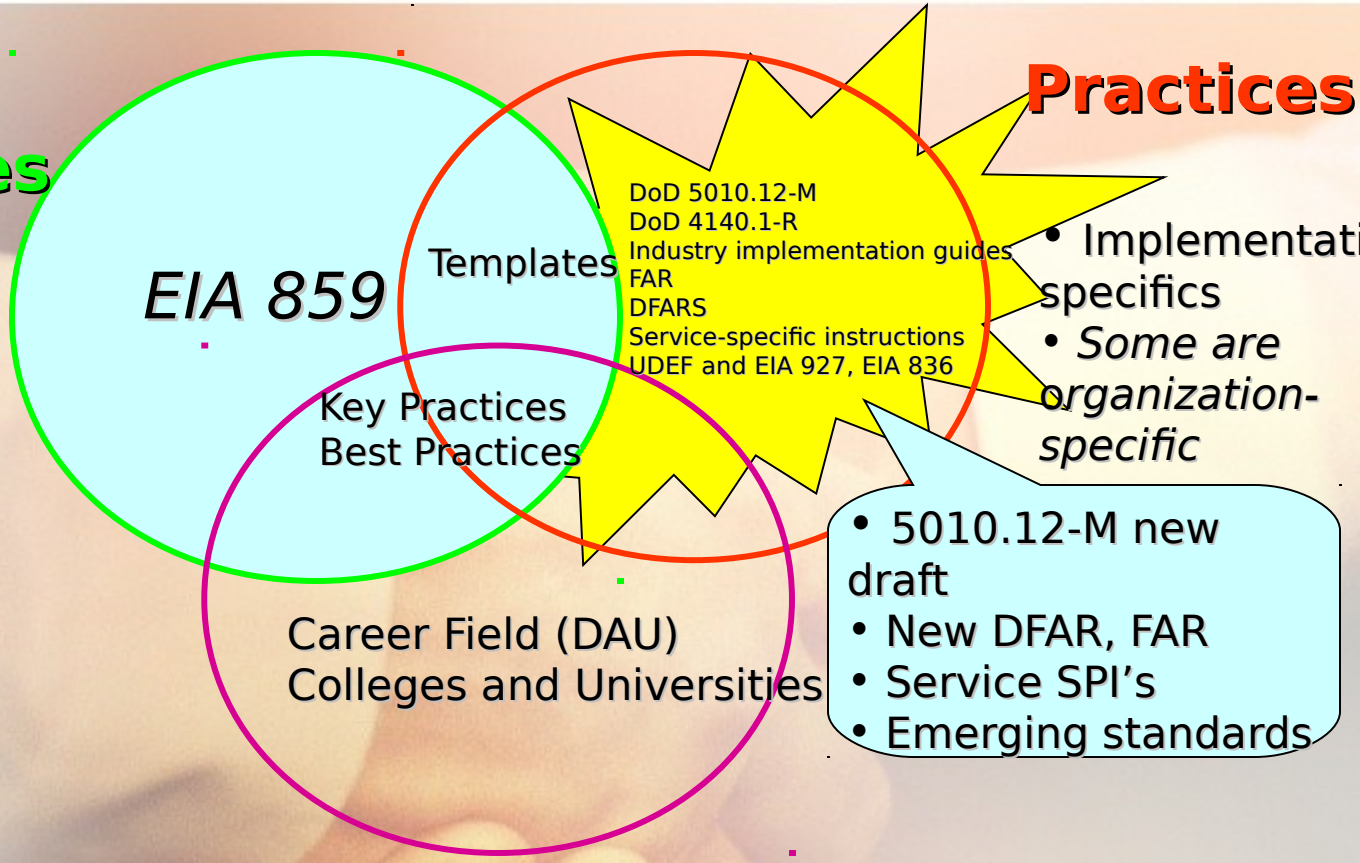

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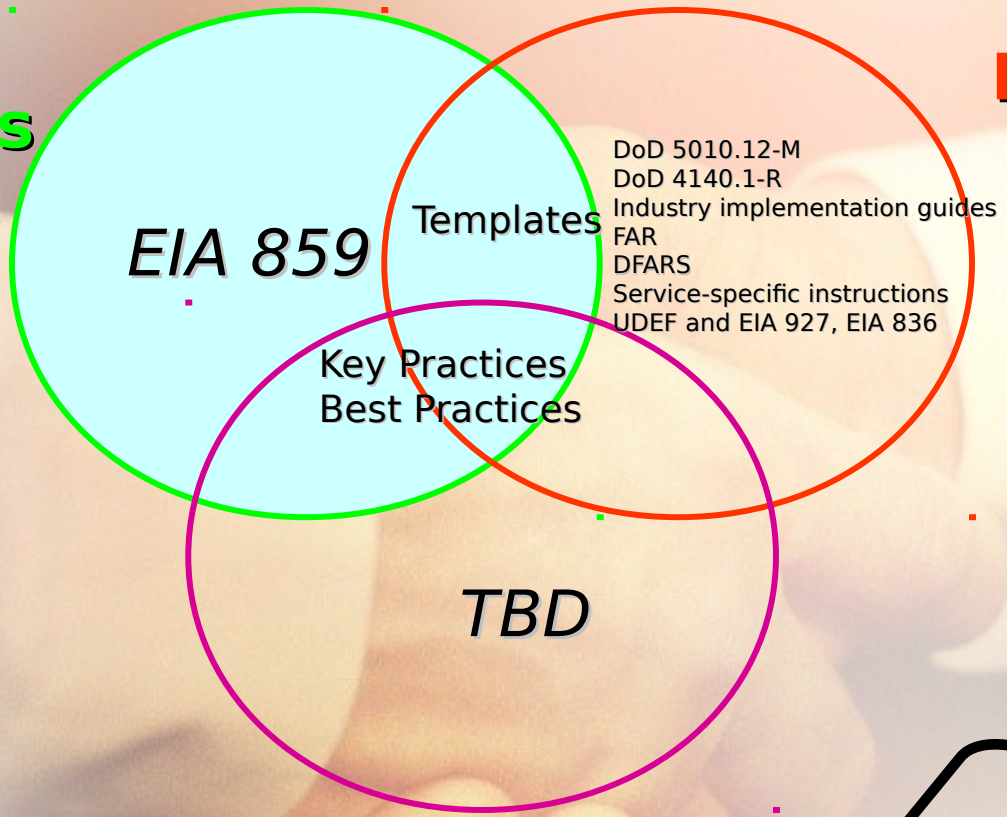


DoD 5010.12-M
DoD 4140.1-R
Industry implementation guides
FAR
DFARS
Service-specific instructions
UDEF and EIA 927, EIA 836

Practices

- Implementation specifics
- Some are organization-specific

Training

Basic and Advanced
(PM and Practitioner)

Complete solution addresses all three

Other Work Areas, cont.

- DoD 5010.12M
  - In final coordination
- DoD data strategy
  - EIA-859 articulates general principles of DM
  - DoD 5010.12M provides mechanics—how to order given a decision to order data
  - Gap in the middle: do not have contemporary DoD data management strategy
    - Appears to be wide variety of essentially ad-hoc practices underway, particularly with regard to drawings and other technical data. Some of these may be best practices but do not know.
    - For certain no longer routinely acquiring data essential to logistics optimization, supply chain integration (e.g., failure modes, failure rates, demand rates, sources and methods of repair). Do not have good understanding of extent to which this is or is not a problem
    - Lack consistent sense of when to order data, what data to order, when to provide for access rather than delivery, when to put in place contingent provisions
    - Situation closely related to current “chaotic” approaches to integrated digital environments (IDEs)
    - May be worth while, given anticipated success of EIA 859, to turn attention to creation of DoD DM strategy
      - Probably not a prescriptive – must do – strategy; do need flexibility
      - Envision document that characterizes environment, better and best practices, what should be done at program management level and what at enterprise level – ***a new governance model***

Where do we go from here?

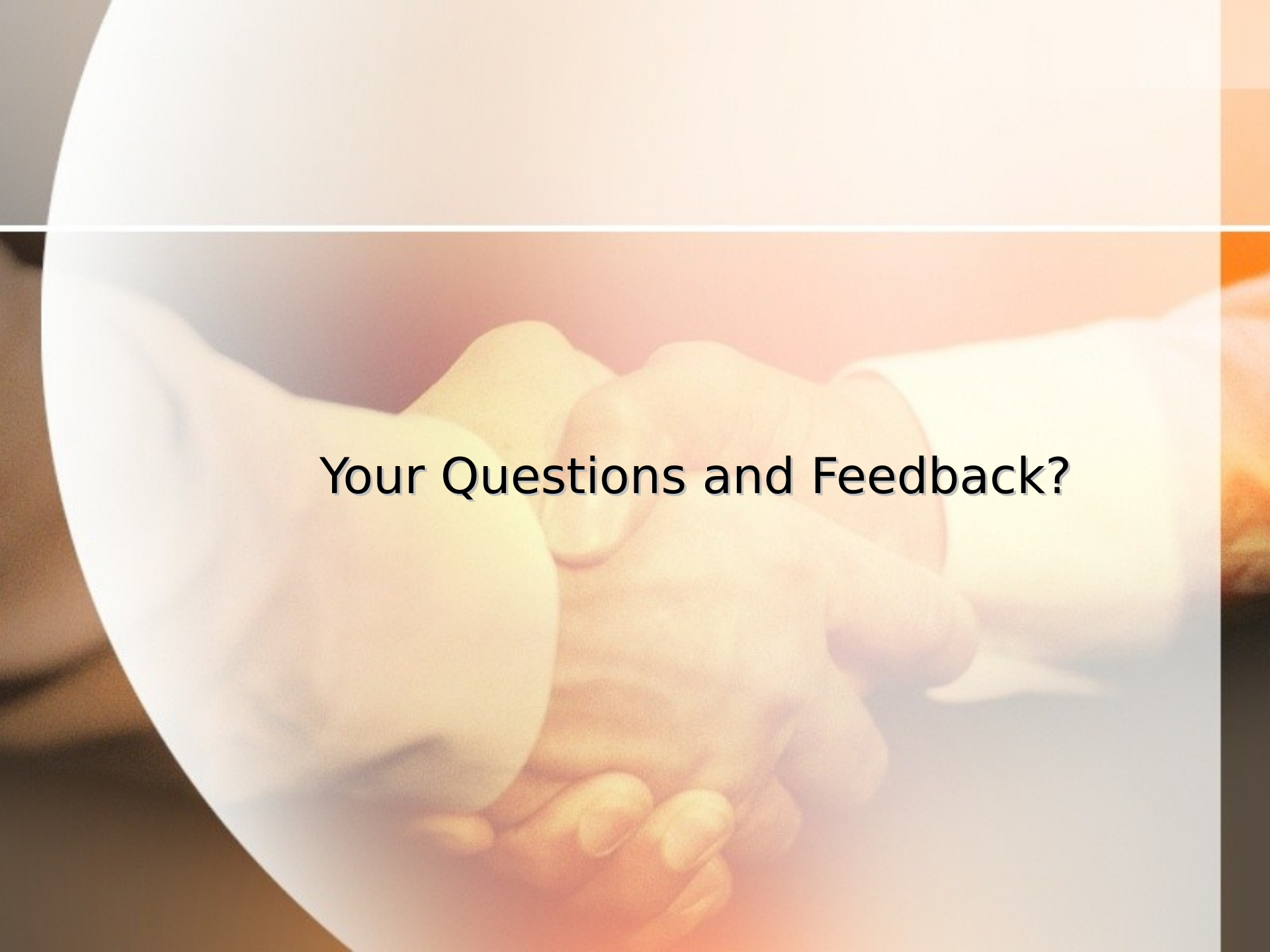
Forward Initiatives

- 859 Handbook
- DM Maturity/Capability Model
- DM BoK
- Training, Certification
  - Other institutionalization pathways

Summary

- Business case established
- Principles in place
- Handbook, community of practice, body of knowledge are emerging/planned
- Incorporation, institutionalization need is recognized
- Ancillary issues in DM are surfaced for resolution

The challenges are recognized and defined.
Can solutions be far behind?


Your Questions and Feedback?